METROPARKS
TOLEDO

2020-2021 Deer Management Plan

and

Request for Deer Damage Control Permit

SUBMITTED 11/10/2020
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I. INTRODUCTION

A. METROPARKS TOLEDO GOVERNING POLICIES

The following polices governed the development of the 2018-2019 deer management plan:

POLICY: THE MISSION OF THE METROPOLITAN PARK DISTRICT

The mission of Metroparks Toledo is to conserve the region's natural resources by creating, developing, improving, protecting, and promoting clean, safe, and natural parks and open spaces for the benefit, enjoyment, education, and general welfare of the public.

Board Policy #: 1	**Resolution #: 60-01**	**Approved: August 15, 2001**
	Resolution #: 58-08	**Approved: July 16, 2008**
	Resolution #: 79-14	**Approved: June 4, 2014**
	Resolution # 112-17	**Approved: December 20, 2017**

POLICY: STEWARDSHIP OF PARKLANDS

Every activity of the Metropolitan Park District of the Toledo Area is subordinate to its duty to faithfully preserve the public parklands for future generations in essentially their natural state.

Ongoing research has identified significant representative areas that contain rare and endangered plants, animals, and natural features within the Metroparks, including the Oak Openings Eco-region, Lake Erie Coastal Marshes, Maumee River Alvar Ledges, the Great Black Swamp, Oxbow/Floodplain/Riverine Wetlands and prairies, Glacial Groove and Fossil Bedrock Outcroppings, as well as wet prairie.

These natural areas are land and water resources where natural processes are sustained through active best management practices with a goal of sustaining and enhancing the natural biodiversity and global connection of these representative areas of Northwest Ohio.

Where significant cultural resources are present in natural areas and are worthy of preservation for their historic value, they shall be protected and presented for public appreciation and enjoyment to an extent compatible with the mission of the park district.

The Metropolitan Park District of the Toledo Area will provide a leadership role in cooperation with other public and private agencies, and private landowners to preserve significant natural, historic, and cultural areas to enhance the quality of life within the northwest Ohio region.

Board Policy #: 4	**Resolution #: 59-02**	**Approved: August 21, 2002**
	Resolution #: 58-08	**Approved: July 16, 2008**
	Resolution #: 112-17	**Approved: December 20, 2017**

B. WILDLIFE MANAGEMENT PHILOSOPHY AND PLANNING FRAMEWORK

The following management philosophy and planning framework were used to guide the development of the 2020-2021 deer management plan.

1. PROBLEM OF OVERABUNDANCE OF WILDLIFE POPULATIONS

   The Northwest Ohio landscape has been irrevocably altered by humans. Human-induced changes to natural land cover have impacted populations of native and nonnative wildlife species, some negatively and others positively. Those species whose populations increase within the human-dominated landscape typically share one or more of the following traits:

   a) They tend to be habitat generalists which benefit from increased amounts of habitat edge associated with large-scale habitat fragmentation caused by human-induced land-use change.
   b) They are well adapted to living in suburban and exurban landscapes typically resulting from sprawl-type land development.
   c) They are relatively free from pressure from top predators which are largely absent from these human-dominated landscapes.
   d) They benefit from a lack of human controls on their population (such as hunting or trapping) which are largely absent from urban areas where such activities are not permitted.

2. DEFINING CARRYING CAPACITY:

   Wildlife species exhibiting one or more of the above characteristics pose an increased risk of exceeding their biological, cultural, and/or ecological carrying capacities and may pose significant threats to native ecosystems including:

   a) Excessive direct predation on desired native plant and/or animal species
   b) Loss of habitat for desired plant and/or animal species, especially those that are rare, threatened or endangered
   c) Spread of wildlife diseases associated with high population densities

   Within the context of this management plan document, the following definitions apply:

   Biological Carrying Capacity: the maximum population size of a given species that can be supported within a set geographic area. Populations in excess of the biological carrying capacity can cause long-term degradation to the health of the species and its habitat.

   Cultural Carrying Capacity: the maximum population size of a given species that can be supported within a set geographic area based on locally accepted cultural values and norms.

Ecological Carrying Capacity: the maximum population size of a given species that can be supported without adversely impacting populations of other native plant and animal species. It is important to note that ecological carrying capacity may be exceeded even when biological and/or cultural carrying capacities are not.

3. WILDLIFE MANAGEMENT PLANNING FRAMEWORK

In keeping with Board Policies 1 and 4, management of overabundant wildlife populations should be done in a manner that is safe, ethical, legal, and in accordance with currently accepted best management practices.

Management of overabundant wildlife populations should be considered under one or both of the following scenarios:

a) Ecologically-based wildlife population management: Should be considered when a given animal population exceeds its biological and/or ecological carrying capacity as evidenced by appropriate ecological indicators such as:
   - Widespread declines in the health of animals within the population
   - Excessive loss of other desirable native plant or animal species due to direct predation from animals within the population
   - Overall declines in ecological condition or native biodiversity associated with overabundance of animals within the population

b) Situational wildlife population management: Should be considered when the cultural carrying capacity of a given species is exceeded resulting in a significant negative impact on park visitor experience such as:
   - Excessive animal waste occurring on lawns or developed areas where visitors congregate
   - Damage to the park district's built infrastructure.

C. WHITE-TAILED DEER ECOLOGY AND POPULATION TRENDS

The white-tailed deer (hereinafter "deer") is a native wildlife species occurring in every Ohio county and throughout the eastern United States. Deer are highly adaptable, utilizing a variety of habitats but are especially well suited for forested habitats near forest edges where buds, stems, and leaves of woody and herbaceous plants are abundant (PDCNR 2013). Deer are generalist herbivores, consuming a wide range of woody and herbaceous plant species and plant parts with specific dietary preferences varying by season and habitat (USDA 2014). Deer have an innate ability to preferentially select plants and plant parts that provide the greatest nutritional value for the least physiological cost (Berteaux et al. 1998). An individual deer typically consumes three percent of its body weight per day (Curtis and Sullivan 2001), thus a single 200-pound adult deer consumes roughly 6 pounds of vegetation each day.

Deer are polygamous (i.e., a single male breeds with multiple females), breeding from October to January with peak breeding activity occurring in early to mid-November. Gestation averages 200 days with most fawns born from late May through mid-June. Fawns are weaned at 10 to 12 weeks and female fawns are capable breeding within their first 6 months. Life expectancy averages two years for males and three years for females in the wild, though individuals may live up to 15 years. In Ohio, adult males typically weigh 130-300 pounds while adult females typically weigh 90-210 pounds (ODNR *undated*).

The reproductive potential of Ohio's deer herd is extremely high. In western Ohio, over 50% of fawn does become pregnant, while pregnancy rates of yearling and adult does exceed 90%. Over 70% of yearling and adult does give birth to twins while 10% of adult does give birth to triplets (Tonkovich et al. 2004). Recruitment and mortality estimates show that Ohio's deer herd is capable of a 50-65% net population increase from the spring pre-fawning period to the fall pre-hunting period (Stoll and Parker 1986). As an example of the high reproductive potential of deer, in the University of Michigan's 1,100-acre fenced George Preserve an introduced population of six deer grew to 222 individuals in seven years (McCullough 1984). Over the past century, the Ohio deer population has exhibited an exponential growth rate since being reintroduced in the 1930s following extirpation from the state around 1904 due to overhunting and habitat loss (USDA 2009). Ohio's deer herd grew from 17,000 deer in 1970 to an estimated peak population of 700,000 deer in 2013 resulting from state-wide habitat improvements and zone-based hunting regulations (Tonchovich 2005).

D. Ecological Impacts of Deer Overabundance

Deer are considered a keystone herbivore, thus they have a disproportionally large impact on the ecosystem relative to their abundance (Urbanek et al. 2012). The intensity of deer impacts to the ecosystem is widely known to be positively associated with deer population density. Because deer are selective browsers, these impacts disproportionately affect certain preferred plant species over other less preferred species (Gill 1992). At high population densities, deer browse is known to reduce the number of tree seedlings and saplings, reduce growth and reproduction of woodland herbaceous plants, cause local extinction of herbaceous species, and decrease overall vegetation density (Shelton et al. 2014). Excessive deer browse can reduce biological diversity by decreasing abundance of browse-sensitive plant species, leading to dominance of browse-tolerant plant species (Gill 1992). Heavy deer browse is also known to increase the spread of invasive species and lead to long-term shifts in forest succession (Côté et al. 2004). While threshold deer density associated with negative ecological impacts varies by ecosystem and geographic region, Horsley et al. (2003) found that negative impacts on forest regeneration in northern hardwood forests of the eastern United States were strongly associated with deer populations >~20 deer per square mile.

In addition to impacts to native plant species and communities, deer overabundance has been found to negatively impact other native wildlife species including birds, small mammals, amphibians, reptiles and arthropods by changing food availability, cover from predators, and microhabitats (Shelton et al. 2014). For example, deCalesta (1997) found that in managed Pennsylvania forests with high deer population densities, species richness and abundance of intermediate canopy-nesting birds (those nesting in the mid-tree canopy) declined by 37% and 27%, respectively. Additionally, five species of birds disappeared from forests when deer densities reached 38 deer per mile^2 and another two species were lost when deer densities reached 64 deer per mile^2. Indirect effects of deer overabundance include loss of forest leaf litter, compaction of soils, and changes in nutrient cycling which are known to affect densities of arthropods both above- and below-ground (Shelton et al. 2014). All of these impacts to plant and animal communities, both direct and indirect, are known to occur at deer population densities well below their biological carrying capacity (McShea 2012). Thus there is a need to manage deer populations to mitigate these effects even when there are no signs that the deer population itself is under ecological stress.

II. 2020-21 Deer Management Plan

A. Description of Area to be Managed

Metroparks Toledo (Metroparks) is a special park district established under Ohio Revised Code Chapter 1545, which owns and manages over 12,000 acres of parklands and greenways in and around Lucas County, Ohio (see Attachment A). The western portion of the park district (approx. 60% of all parkland) occurs within Ohio's Oak Openings Region, which is one of Ohio's most biologically diverse land areas, harboring one third of Ohio's state-listed rare and endangered plant and animal species in an area that collectively represents less than 0.5% of Ohio's total land area. The central portion of the park district (approx. 25% of all parkland) is dominated by the Maumee River, Ottawa River and Swan Creek drainages. These central parklands provide critical natural / forested habitat along these waterways and protect the largest tracts of natural habitat near Lucas County's urban center. The eastern portion of the park district (approx. 15% of all parkland) occurs within the lake plains of Lake Erie's western basin, providing important wetland habitat for migratory / resident waterfowl, songbirds and other wildlife species. Following are descriptions of each park area included in the 2020-21 deer management. Individual park maps are included in Attachment A.

Middlegrounds (28 acres, City of Toledo)

Middlegrounds, located in downtown Toledo, includes a half-mile of river frontage along the Maumee River beginning at the Anthony Wayne Bridge and extending southwest of Martin Luther King Plaza. Middlegrounds was officially opened as a park in 2016, consisting of 28 acres of reclaimed riverfront property. The transformation of the land began with the removal of 8,000 tons of debris, construction of stormwater wetlands, restoration of natural grasslands, and planting of approx. 500 trees and shrubs.

Oak Openings Preserve (4291 acres, Swanton Township)
Oak Openings Preserve features the largest contiguous block of protected natural areas in northwest Ohio. It was first established as an open park in 1931. The park contains approx. 3,000 acres of native hardwood forests (upland oak forests, oak swamp forests, and floodplain forests), 650 acres of native Oak Openings plant communities (savannas, barrens, upland prairies, wet prairies), and 350 acres of planted coniferous forests (dominated by monoculture pine plantations established in the 1930s through 1970s). Oak Openings Preserve supports populations of 53 documented plant species and 13 documented animal species designated as endangered or threatened in Ohio. Additionally, the park supports four biological communities designated as globally imperiled or vulnerable (G2 or G3) by the International Union for Conservation of Nature (IUCN). The park is surrounded by a matrix of agricultural lands, residential dwellings, and large forested tracks managed as part of the Maumee State Forest.

Pearson Metropark
(627 acres, City of Oregon)
The original 320-acre parkland area established as Pearson Metropark in 1934 features one of the last remnant mature hardwood swamp forests in northwest Ohio outside of the Oak Openings Region. The park sustains habitat for populations of 3 documented plant species and 9 documented animal species designated as endangered or threatened in Ohio. In 2002, Pearson's acreage was nearly doubled with the acquisition of the 303-acre Blodgett farm, which was subsequently reforested with over 100,000 native hardwood trees in an effort to restore high quality mature swamp forest habitat along with associated wet meadows and marshland areas as part of the Pearson Wetland Mitigation Bank.

Side Cut / Blue Grass Island / Fallen Timbers Battlefield
(609 total acres, City of Maumee) *NOTE: In a change from previous years, Audubon Islands State Nature Preserve has been removed from consideration from this year's deer management plan due to logistical challenges with accessing the site.*

Side Cut, the first Metropark in Lucas County, is named for the former "side cut" extension of the Miami and Erie Canal that connected the main line of the canal with the city of Maumee. At 321 acres, Side Cut is the largest protected natural area along the lower Maumee River, providing significant forest and grassland habitat for migratory birds and resident wildlife species (including three species designated as endangered or threatened in Ohio). Blue Grass Island (85 acres) is an undeveloped forested island in the Maumee River that was acquired by Metroparks Toledo in 1974 and is now managed as part of Side Cut. Fallen Timbers Battlefield (203 acres) features 60 acres of mature hardwood forests, while much of the remaining site is being reforested by Metroparks with over 20,000 trees planted to date. Collectively, this group of parklands represents the vast majority of natural areas remaining within the City of Maumee.

Swan Creek Preserve and Brookwood Area (600 acres, City of Toledo)
Swan Creek Preserve (451 acres) features the largest tract of contiguous forest within the City of Toledo. The park was established in the 1960s to mitigate habitat loss resulting from the expansion of the interstate highway system within the Toledo area. The preserve is largely surrounded by a mixture of commercial and residential development along Airport Highway and Glendale Avenue, although the preserve is also connected to a series of other natural areas along the Swan Creek floodplain. Swan Creek Preserve supports populations of seven animal species designated as "of concern" by the Ohio Division of Wildlife. Additionally, the preserve harbors populations of a variety of spring ephemeral wildflower species including large white trillium (*Trillium grandiflorum*) and sessile trillium (*Trillium sessile*). However many of these populations have been in decline since the 1990s based on observations from Metroparks naturalists and volunteer plant monitors.

The Brookwood area (149 acres), located 0.9 miles west and upstream of Swan Creek Preserve consists of two properties donated to Metroparks between 1995 and 2004 and adjacent property acquired by Metroparks in 2018. These parklands feature high quality floodplain forests, wet meadows, Swan Creek river oxbows, and a great blue heron rookery.

Toledo Botanical Garden (60 acres, City of Toledo)
Toledo Botanical Garden began in 1964 with the donation of 20 acres of private land to the City of Toledo by George P. Crosby for the purpose of creating a public park. Since that time, the park has expanded to sixty acres of display gardens, plant collections, and a restored natural area along a tributary of the Ottawa River.

Wildwood Preserve (493 acres, Sylvania Township)
Wildwood Preserve occurs on the site of the former Stranahan estate acquired by Metroparks in 1975. The park consists of approx. 400 acres of native hardwood forests (dominated by mature closed canopy red oak forest) intermixed with 50 acres of native Oak Openings meadows and prairies. The park supports populations of 18 known plant species designated as endangered or threatened in Ohio. Additionally, the park supports 1 biological community designated as globally vulnerable (G3, IUCN) and features several acres of unique, ecologically sensitive forested ravines serving as headwaters to the Ottawa River. The area surrounding the park is dominated by commercial and residential land uses as well as a natural riparian corridor along the Ottawa River connecting Wildwood Preserve to other nearby natural areas including Camp Miakonda, and University of Toledo's Stranahan Arboretum. The park lies immediately adjacent to the village of Ottawa Hills where controlled archery deer hunting is utilized as a management tool to help control deer populations. Other lands surrounding Wildwood Preserve are not conducive to deer hunting due to the heavy concentration of residential dwellings and commercial buildings. Wildwood Preserve is the region's most frequently visited park, with an estimated 1.5 million annual visitors.

B. LEGAL/MANAGEMENT OBLIGATIONS FOR MANAGING

Metroparks' legal mandate is established under Ohio Revised Code (ORC) Chapter 1545. Metroparks is governed by a 3-member Board of Park Commissioners appointed by the probate judge of Lucas County. According to ORC 1545.11, "The board of park commissioners may acquire lands either within or without the park district for conversion into forest reserves and for the conservation of the natural resources of the state, including streams, lakes, submerged lands, and swamplands, and to those ends may create parks, parkways, forest reservations, and other reservations and afforest, develop, improve, protect, and promote the use of the same in such manner as the board deems conducive to the general welfare." Park rules and regulations are set by the Metroparks Board of Park Commissioners to protect members of the public as well as the natural and historical resources entrusted to Metroparks. These park rules and regulations are enforced by Metroparks rangers serving as commissioned Ohio peace officers.

C. SPECIFIC REASONS/NEED FOR DEER MANAGEMENT PROGRAM

The Metroparks deer management program is needed to address ongoing negative ecological impacts associated with overabundance of deer within the park district's natural areas. These impacts include documented loss of biological diversity, negative impacts to forest regeneration, direct damage to woody and herbaceous plants, and increased costs of restoration and maintenance in response to deer damage. Metroparks utilizes a formal deer browse damage assessment protocol to evaluate deer-related damage to its forested natural areas (detailed in Attachment B). Additional documentation regarding the need for a deer management program is detailed in section III. C. below.

D. POPULATION ESTIMATES OF THE AREA TO BE MANAGED

In 2009, Metroparks began tracking the size of its deer herd using aerial infrared camera surveys, contracted through Davis Aviation, Kent, Ohio. For this survey method, a thermal imaging, infrared video camera was mounted to a fixed-wing airplane and flown in a grid pattern over targeted parklands at 1,500 feet elevation at night. Video footage was analyzed on the ground from a video monitor and the number of deer was recorded, noting both positively confirmed deer sightings and possible deer sightings. For Metroparks population estimates, only positively confirmed deer sightings were included in population estimates. In addition to internal park areas, a 1,500-ft buffer surrounding each park was surveyed to account for movement of resident deer herds outside of park areas.

Beginning in 2013, Metroparks initiated aerial snow count surveys of targeted parklands in addition to aerial infrared surveys. Park personnel were flown in a small helicopter over park areas in a grid pattern during daylight hours and direct counts were made of all deer observed. A 1,500-ft buffer surrounding each park was also surveyed. For this survey technique, a minimum of eight inches of snow cover on the ground is desired for

optimizing deer counts. Metroparks staff implemented snow counts with a minimum of three inches of snow cover, which may have elevated the risk of missing some deer during counts. The snow count method is considerably less expensive than infrared surveys and is utilized as the primary survey technique when suitable ground conditions allow.

Total number of deer counted inside each park was combined with number of deer counted within a 1,500-ft buffer outside each park to determine a total population index adjusted for park size, reported as number of deer per square mile for each park. Additionally, a surplus population index was estimated using an initial range of 15 to 25 deer per square mile as a tolerable upper limit population threshold for Metroparks deer herds. This range was established as a preliminary population target based on multiyear observations from other Ohio park districts that have previously implemented deer management programs as well as expert opinion gathered from wildlife biologists from state and federal agencies, other Ohio park districts, and Metroparks staff.

The latest snow count survey was conducted on February 8, 2020. Fall 2020 population estimates were determined for each park area using the following formula:

$$N_{2020} = [PC + (PE * PF * PR * FB * FS)] * AS / DP$$

where:
N_{2020} = 2020 fall population estimate
PC = February 2020 population count
PF = Proportion of females in population (0.60, from DeNicola et al. 2008)
PR = Mean pregnancy rate of females in population (0.90, from Metroparks Toledo 2020 End of Culling Report, excludes females culled prior to January 1, 2020)
FB = Mean fawn births per pregnant female (1.77, from Metroparks Toledo 2020 End of Culling Report)
FS = Annual fawn survival (0.529, from Vreeland et al. 2004)
AS = Annual adult survival (0.872, from Storm et al. 2006)
DP = Detection probability from aerial deer count surveys (estimated at 0.90, actual detection probability ranges from 0.31 to 0.99, see Storm et al. 2011)

Population estimates are reported on the following page

Following is a summary table of deer population estimates for each park area. 'Count' and 'estimate' refer to number of deer. 'Density' is reported as number of deer per square mile.

Park	Survey Area (sq. mi.)[2]	February 2020 Count[3]	February 2020 Density	Fall 2020 Estimate	Fall 2020 Density
Oak Openings Preserve	9.70	179	18/mi^2	261	27/mi^2
Pearson	0.98	26	27/mi^2	38	39/mi^2
Side Cut & associated parklands[1]	1.73	78	45/mi^2	114	66/mi^2
Swan Creek Preserve & Brookwood Area	3.52	108	31/mi^2	158	45/mi^2
Wildwood Preserve	2.23	32	14/mi^2	47	21/mi^2

1 Associated parklands include Blue Grass Island and Fallen Timbers Battlefield. Note that Audubon Islands SNP has been removed from consideration in this year's deer management plan due to inaccessibility. The survey area and February count are therefore adjusted accordingly.

2 'Survey Area' includes the area of each park and also a 1,500-foot buffer surrounding each park, except for Pearson where the 1,500-foot buffer was not counted due to lack of suitable habitat within the buffer.

3 February 8, 2020 population counts for Side Cut and Pearson were adjusted downward by 1 deer and 3 deer, respectively, to account for deer that were culled from these parks after the February 8, 2020 population count).

E. DESIRED LONG-TERM GOALS

The desired long-term goal for the Metroparks deer management program is to reduce deer-related damage to park natural areas and to sustain native biological diversity across the park district. Metroparks staff will continue to monitor ecological conditions at each park following planned culling activities in 2020-21. Through adaptive resource management, Metroparks staff will continually review ecological indicators of deer damage on at least an annual basis and adjust both short-term and long-term goals as natural resource conditions change.

F. MANAGEMENT TECHNIQUES TO BE USED

Metroparks intends to implement a culling program at the parks described in Section II A above using trained marksmen from USDA APHIS Wildlife Services and Metroparks law enforcement staff. A more detailed description of planned deer culling operations is included as Attachment E.

Prior to pursuing a culling program at these parks, Metroparks staff carefully considered other available management techniques, both lethal and nonlethal, to accomplish Metroparks deer management objectives at these parks. Following is a brief summary of other management alternatives that were evaluated prior to selecting deer culling as the best available management technique to accomplish Metroparks deer management objectives at these parks.

F.1 Nonlethal Alternative Management Techniques

A variety of nonlethal alternatives are available to property owners to reduce deer damage and deter deer from utilizing their property. These techniques include use of

odor repellents (ex. predator urine, soap), taste replants (ex. hot pepper), scare tactics (ex. noise makers), and fencing. However, within large natural areas such as Oak Openings Preserve and Wildwood Preserve (with a combined area of over 7 miles^2), deterrents are neither cost effective nor realistically feasible on a large scale. Currently, fencing is used throughout the park district to protect landscape trees, plants, and horticultural areas against deer browse (such as the Shipman Garden and sensitive areas within Toledo Botanical Garden). However, fencing is simply too cost prohibitive to protect natural areas within these parks on even a limited scale.

Other nonlethal alternatives to deer culling that were determined to be unsuitable for accomplishing Metroparks deer management objectives include:

a) Live trapping and relocation: This practice was not considered as a viable option to accomplish Metroparks deer management objectives due to its high costs, risk of pathogen transmission (e.g., chronic wasting disease) from the source population to the release site, unavailability of suitable release sites, and concerns over stress to captured deer, as it has been found that most relocated deer survive less than one year after being released in a new environment (Conover 2002).
b) Surgical sterilization: This practice was not considered as a viable option to accomplish Metroparks deer management objectives for many of the same reasons explained above. Within a large natural areas context, it would be practically impossible to sterilize enough animals to have any significant effects on the overall population. Further, it does not address the underlying issue that immediate reductions in deer numbers are required to protect Metroparks ecological resources.
c) Contraception: Chemical contraception is not authorized by the Ohio by Division of Wildlife for use in Ohio.

F. 2. Controlled Archery Program

Since 2013, Metroparks has implemented a controlled archery hunting program on several thousand acres of parkland in the Oak Openings Region during the regular state-wide deer archery season. Metroparks staff will continue to seek opportunities to expand this archery program into additional park areas where it can be implemented safely and effectively without adversely impacting other park users and activities. Detailed information on the Metroparks controlled archery hunting program can be found on the Metroparks website (https://metroparkstoledo.com/natural-wonders/deer-management/deer-management-archery-program/). A summary of program results is included as Attachment C.

For Oak Openings Preserve, the controlled archery hunting program will continue to be used to help achieve reduction goals for this park. However, based on data collected during the previous five controlled archery hunts (an average of 25 deer were harvested per year within Oak Openings Preserve between September 2015 and January 2020), Metroparks will need to continue utilizing culling at this park in order to keep the deer population at levels that do not negatively impact park natural resources. Controlled archery hunting will not be utilized at Wildwood Preserve or Pearson (even though

hunting is allowed within the surrounding municipal jurisdictions for these parks) due to heavy visitor use and limited hunter access to remote areas within these park. All other parks included within this deer management plan are located in either the City of Toledo or the City of Maumee where hunting is forbidden under municipal ordinance.

G. PROGRAM EVALUATION

Metroparks staff will utilize an integrated approach to program evaluation that will include:

- Aerial infrared and/or snow count surveys to monitor deer population levels across the park district;
- Overwinter forest browse damage surveys to evaluate negative impacts on forest stand health and recruitment;
- Population monitoring of state-listed rare plants, spring ephemeral wildflowers, and other browse-sensitive species within park natural areas;
- Damage to woody and herbaceous plants within park restoration sites and planting areas; and
- Permanent vegetation monitoring plots established within natural areas across the park district.

Short-term deer population goals for each park will be achieved when deer population densities are no greater than 15 to 25 deer per square mile. Long-term deer population goals will be achieved when deer-related damage to park natural resources has been reduced to sustainable levels.

H. Supporting Documentation: Refer to Section VI.

III. REQUEST FOR 2020 DEER DAMAGE CONTROL PERMIT

A. INTRODUCTION

Refer to Section I above.

B. NUMBER OF TAGS REQUESTED

Metroparks is requesting a total of 205 tags to be filled as described below between December 7, 2020 and February 28, 2021. At least 75% of tags will be antlerless. No more than 25% of tags (up to a maximum of 51) will be antlered.

	Fall 2020 Population:			
Park	Estimate (# of deer)	Density (deer / mi^2)	Surplus Index (at 15/mi^2)	Tags Requested
Middlegrounds	-	-	-	5
Oak Openings Preserve	261	27	115	60
Pearson	38	39	23	15
Side Cut and associated parklands	114	66	88	50
Swan Creek Preserve & Brookwood Area	158	45	105	50
Toledo Botanical Garden	-	-	-	5
Wildwood Preserve	47	21	14	10
Additional Tags[1]				10
Total				205

[1]Due to the variable nature of population estimates, Metroparks requests that the Deer Damage Control Permit include an additional 10 tags (5% of total request) to be used, if necessary, at one or more of the parks listed above based on observed conditions during culling operations in order to achieve overall deer reduction objectives.

C. JUSTIFICATION FOR NUMBER OF TAGS REQUESTED

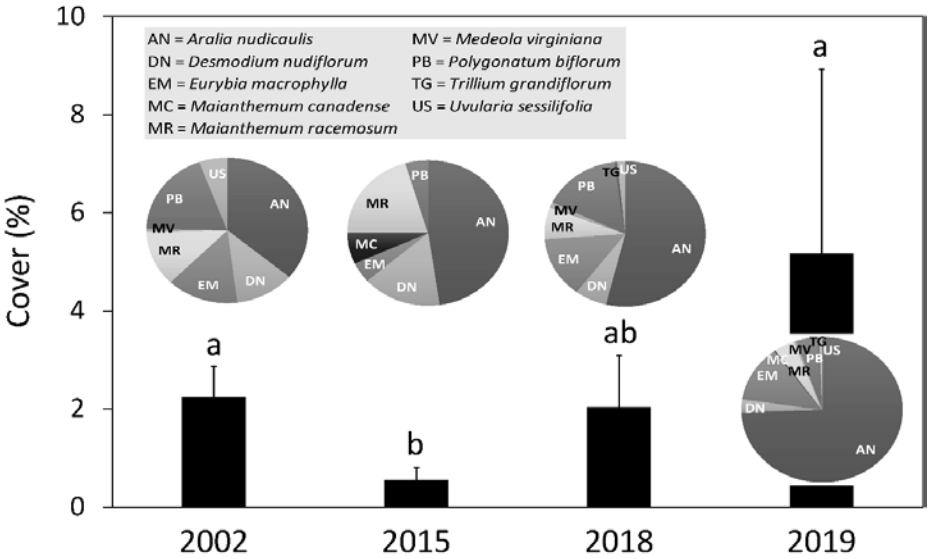
Middlegrounds: 5 tags requested

Although Metroparks has not conducted an annual deer count at Middlegrounds, Metroparks staff have consistently observed between ten and twenty deer at this park. Prior to park opening, Metroparks staff and volunteers planted approx. 500 trees and shrubs throughout the park. Approx. 60-70% of all trees planted have been significantly damaged by deer after planting. At least 20 trees have been killed outright. Because this park is near the urban center of Toledo, it receives no hunting pressure and there are no natural predators to reduce this urban population.

Examples of deer damage at Middlegrounds (2016).

<u>Oak Openings Preserve</u>: 60 tags requested

Following five years of culling efforts at Oak Openings Preserve, Metroparks staff have observed measurable declines in overwinter browse damage and an increase in foliar cover of deer-sensitive herbaceous plants within the park. Based on results from the overwinter browse damage assessment described in Attachment B, the amount of observed heavy to severe browse damage of oak seedlings at this park declined from a high of 66% in 2015 to 4% in 2020. The figure below summarizes results collected from permanent 500m^2 vegetation monitoring plots at Oak Openings Preserve showing an increase in percent cover of deer-sensitive herbaceous plant species as measured within 8 randomly selected oak woodland areas within the park (see Abella et al. 2020).



Based on these collective observations, the park's deer population appears to have been reduced to levels that are ecologically sustainable, at least in the short term.

Aerial snow count surveys conducted in February 2020 show that following the 2019-20 culling season, deer populations were reduced to within acceptable levels. However, based on the population model described in section II.D. (above), which takes into account anticipated population recruitment following spring fawning, fall 2020 populations are again in excess of acceptable population densities. The number of tags being requested (60), in combination with controlled archery hunting occurring within the park between September 2020 and January 2021, is considered sufficient to achieve population reduction objectives for the 2020-2021 season.

Pearson: 15 tags requested
Following initial culling at Pearson during the 2019-20 season, snow count surveys of Pearson conducted in February 2020 showed numbers slightly above desired levels. However, with anticipated recruitment into the population following spring fawning, additional reductions are needed to keep the population within the desired range. Since the 1990s, Metroparks staff have observed a noticeable decline in deer-sensitive spring ephemeral wildflowers such as wild trillium, wild ginger, and cut-leaved toothwort. Additionally, staff have observed browse lines along forested edges throughout the park. Metroparks established formal vegetation monitoring plots within this park in 2018. These plots will be used to help evaluate the effectiveness of deer management efforts within this park moving forward.

Side Cut, Blue Grass Island & Fallen Timbers Battlefield:
50 tags requested

NOTE: In a change from previous years, Audubon Islands State Nature Preserve has been removed from consideration from this year's deer management plan due to logistical challenges with accessing the site.

The deer population within this grouping of parklands has consistently and chronically exceeded acceptable population densities by several fold since Metroparks first began conducting population surveys in 2009. Understory vegetation (including populations of spring ephemeral wildflowers) within these parks is typically sparse and a noticeable browse line is often observable along forest edges. In 2018, data from overwinter browse surveys shows that there were significantly fewer woody stems in plots sampled at Side Cut and Blue Grass Island compared to other park areas, even after removing a total of 84 deer from Side Cut and Blue Grass Island during the 2017-18 season.

Metroparks staff and volunteers have planted over 15,000 trees at Fallen Timbers Battlefield in order to reforest this area. Due to heavy browse pressure within this area, approx. 10,000 tree shelters were utilized for these plantings. While these shelters prevent the trees from being killed outright by deer, tree seedlings are susceptible to deer browsed immediately upon reaching the tops of the tree shelters.

Examples of deer damage at Fallen Timbers Battlefield (2016).

As with previous seasons, persistent flooding and poor ground conditions persisted throughout much of the 2019-20 deer management season. As a result, Metroparks was unable to achieve its deer management objectives for this grouping of parklands during the 2019-20 season, with only 46 deer culled from Side Cut and associated parklands (out of 100 requested tags). The total number of 50 tags requested for these parks in 2020-21, which takes into account anticipated logistical challenges due to poor ground conditions, is anticipated to reduce current densities by nearly half. While this will not bring population levels to within the desired range in the short term, it is important to continue to make incremental progress within these parklands in order to achieve Metroparks' long term objectives of increasing natural forest regeneration, protecting reforestation areas, and increasing foliar cover of herbaceous plants.

Swan Creek Preserve and Brookwood Area: 50 tags requested

Four seasons of deer culling at Swan Creek Preserve have helped to reduce deer-related damage to park natural resources. However, deer numbers within the park are still higher than desired targets. This is likely due (at least in part) to the large number of deer that continue to persist in nearby natural areas adjacent to Swan Creek Preserve. For example, during the February 2020 helicopter snow count, Metroparks staff counted 20 deer within the 149-acre Brookwood Area (a relative density of 100 deer/mi^2). The Brookwood Area remains a high management priority for the 2020-21 season. As with Side Cut, persistent flooding and poor ground conditions persisted throughout much of the 2019-20 deer management season. As a result, Metroparks was unable to achieve its deer management objectives for this grouping of parklands during the 2019-20 season, with only 40 deer culled from Swan Creek and Brookwood (out of 75 requested tags). The total number of 50 tags requested for these parks in 2020-21, which takes into account anticipated logistical challenges due to poor ground conditions, is needed to offset expected spring population recruitment and maintain population densities at their current levels.

Examples of deer browse damage at Swan Creek Preserve (2016).

Certain species of spring ephemeral wildfowers, notably wild trillium (consisting of several perennial species within the genus *Trillium*) are highly preferred by deer, causing declines in trillium populations in the presence of increased deer population densities (Anderson 1994, Pavlovic et al. 2014). At high densities, deer are known to cause population declines in *Trillium* spp. by preferentially browsing flowering plants (Rooney and Gross 2003), thereby prohibiting seed production. Additionally, deer preferentially browse taller plants (Koh et al. 2010) causing declines in survival and fecundity of adult plants following repeated browsing.

Large white trillium (*Trillium grandiflorum*) and sessile trillium (*Trillium sessile*) were once common at Swan Creek Preserve (D. Gehring pers. com.). Today, populations of large white trillium are greatly reduced compared to their extent in the 1990s. Sessile trillium is now largely absent from the preserve, occurring only in small, isolated stands (K. Menard pers. com.). Since establishing new *Trillium* monitoring plots at Swan Creek Preserve in 2016, Metroparks staff have observed that *T. grandiflorum* populations have been slow to recover from long-term, persistent deer browse even within fenced areas now protected from further browse. It is therefore imperative for the health of these populations that deer numbers are further reduced within targeted park areas.

<u>Toledo Botanical Garden</u>: 5 tags requested
Metroparks staff have consistently documented unacceptable levels of deer-related damage at Toledo Botanical Garden. To minimize damage, staff annually implement the following measures:

Physical Barriers

- Install / remove annually a 700-linear foot exclusion fence around the Perennial Garden
- Stake and fence six smaller displays throughout the garden

- Stake and fence a dozen individual specimens (primarily memorial trees)
- Place plastic fence around smaller trees trunks to prevent “buck rub”

Apply deterrents (Liquid Fence, Plantskydd, Spotrete, & Milorganite) multiple times annually to:

- Hosta and Daylily collection
- Roses in Rose Garden
- Taxus (yew) hedges throughout the garden including the Perennial Garden and Conference Center
- Other browse susceptible plants including hydrangeas and Arborvitae

These measures help reduce the damage but are not 100% effective (deterrents wash off, gates are left open, a feisty buck will tear off the plastic fence). Numerous plants have been removed from the garden due to browse or buck rub damage. Because this park is within the City of Toledo, it receives no hunting pressure and there are no natural predators to reduce this urban population.

Examples of deer browse damage at Toledo Botanical Garden.

<u>Wildwood Preserve</u>: 10 tags requested

Wildwood Preserve’s deer population has largely been reduced to sustainable levels since deer culling was initiated at this park in January 2016. Overwinter browse damage has decreased substantially since culling was initiated (see attachment B). Based on these observations, it is Metroparks’ objective for the 2020-21 season to maintain the park’s deer population at its current levels. Based on anticipated spring population recruitment, Metroparks is requesting 10 tags to achieve its objectives for this park.

D. **LOGISTICS OF HOW PROGRAM WILL BE CONDUCTED**

Deer will be culled from each park by trained marksmen from USDA APHIS Wildlife Services and Metroparks rangers who are Ohio certified peace offers. Refer to the work plan included as Attachment D for a detailed outline of program logistics. All venison produced through this culling program will be donated to a local foodbank for immediate use by the general public.

E. **PROPOSED SCHEDULE OF OPERATIONS**

Culling operations shall occur between December 7, 2020 and February 28, 2021.

F. **SUPPORTING DOCUMENTATION:** Refer to Section VI.

IV. END OF CULLING REPORT - *will be submitted to Ohio Division of Wildlife by May 1st, 2021.*

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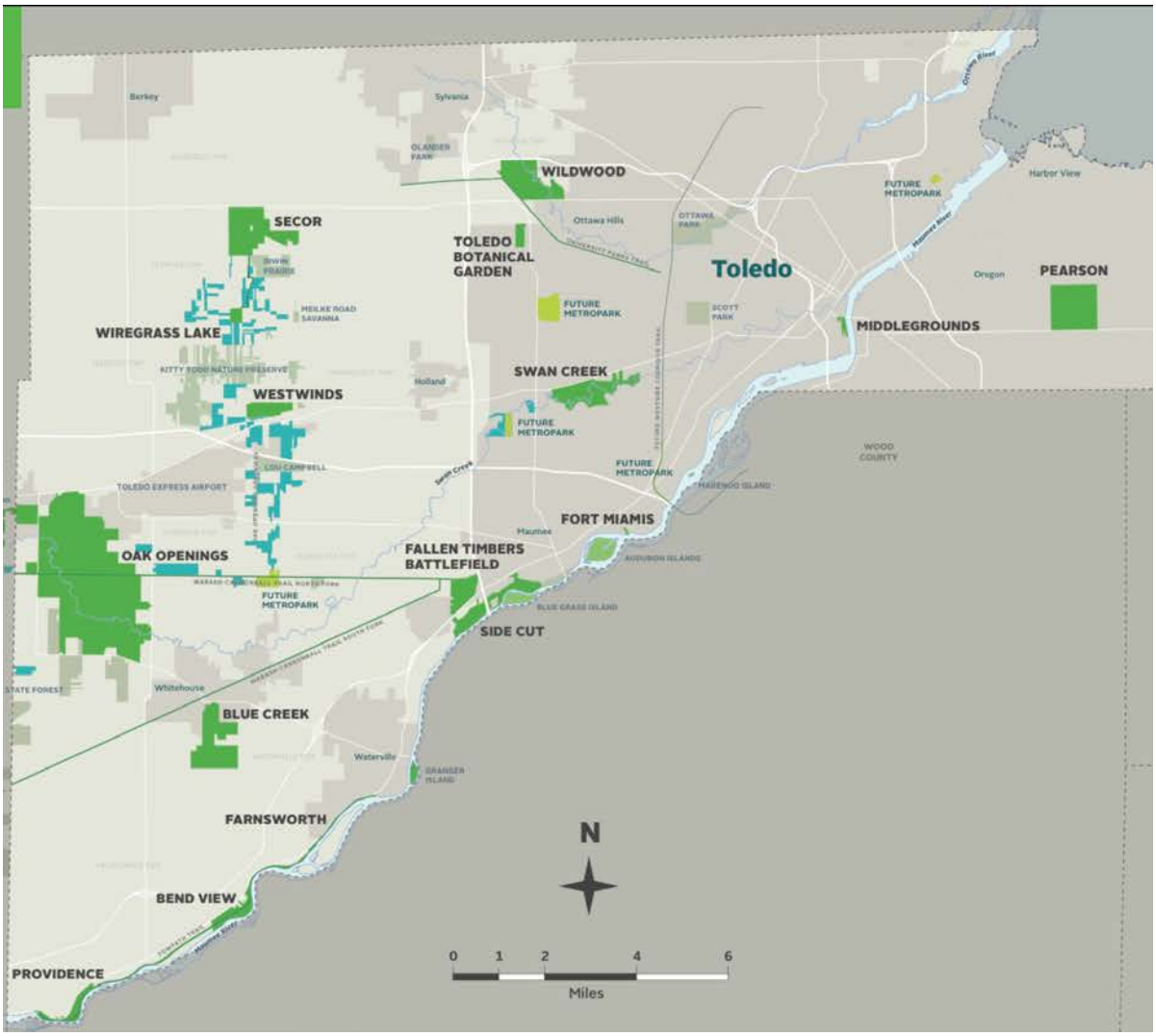
VI. SUPPORTING DOCUMENTATION

The following supporting documents are attached to this management plan:

- Attachment A – Individual Park Maps
- Attachment B – Deer Overwinter Browse Damage Assessment
- Attachment C – Summary of controlled archery program data from the 2013-14 hunting season to present
- Attachment D – Culling Work Plan

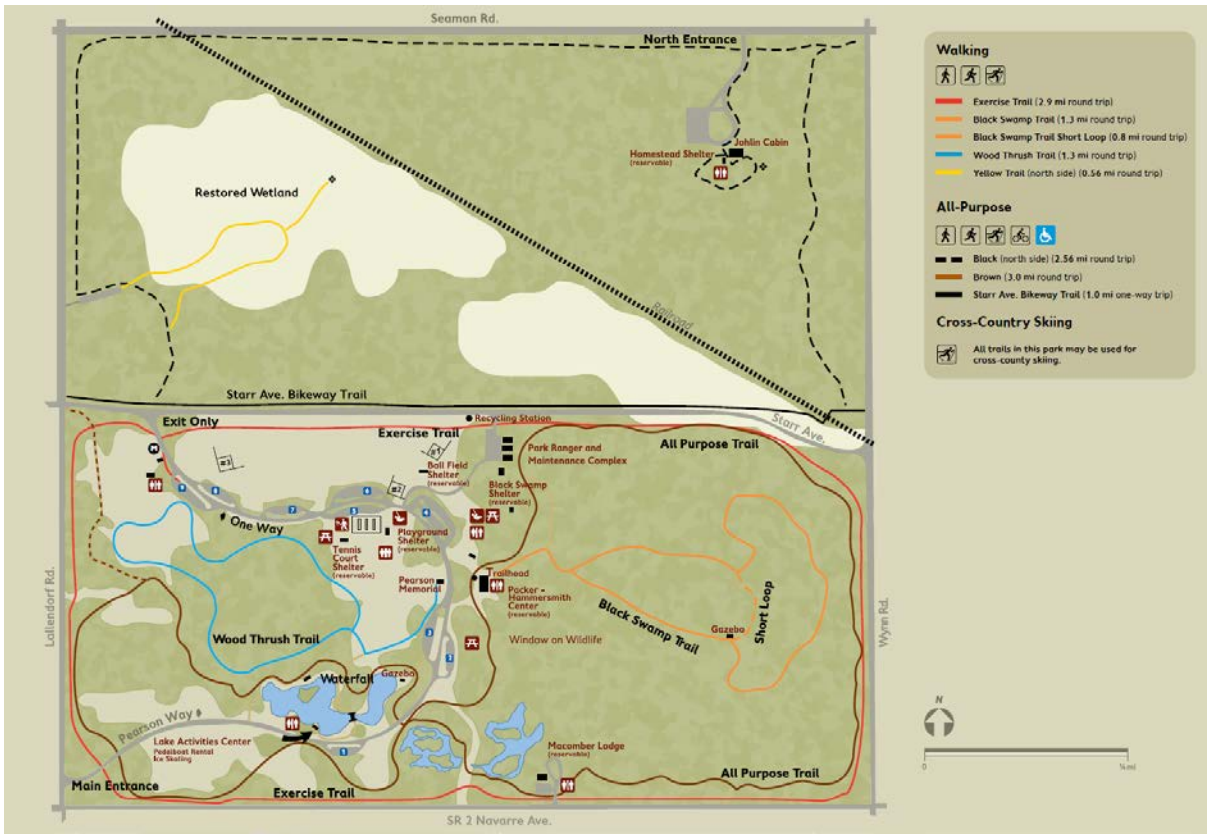
ATTACHMENT A. Park Maps



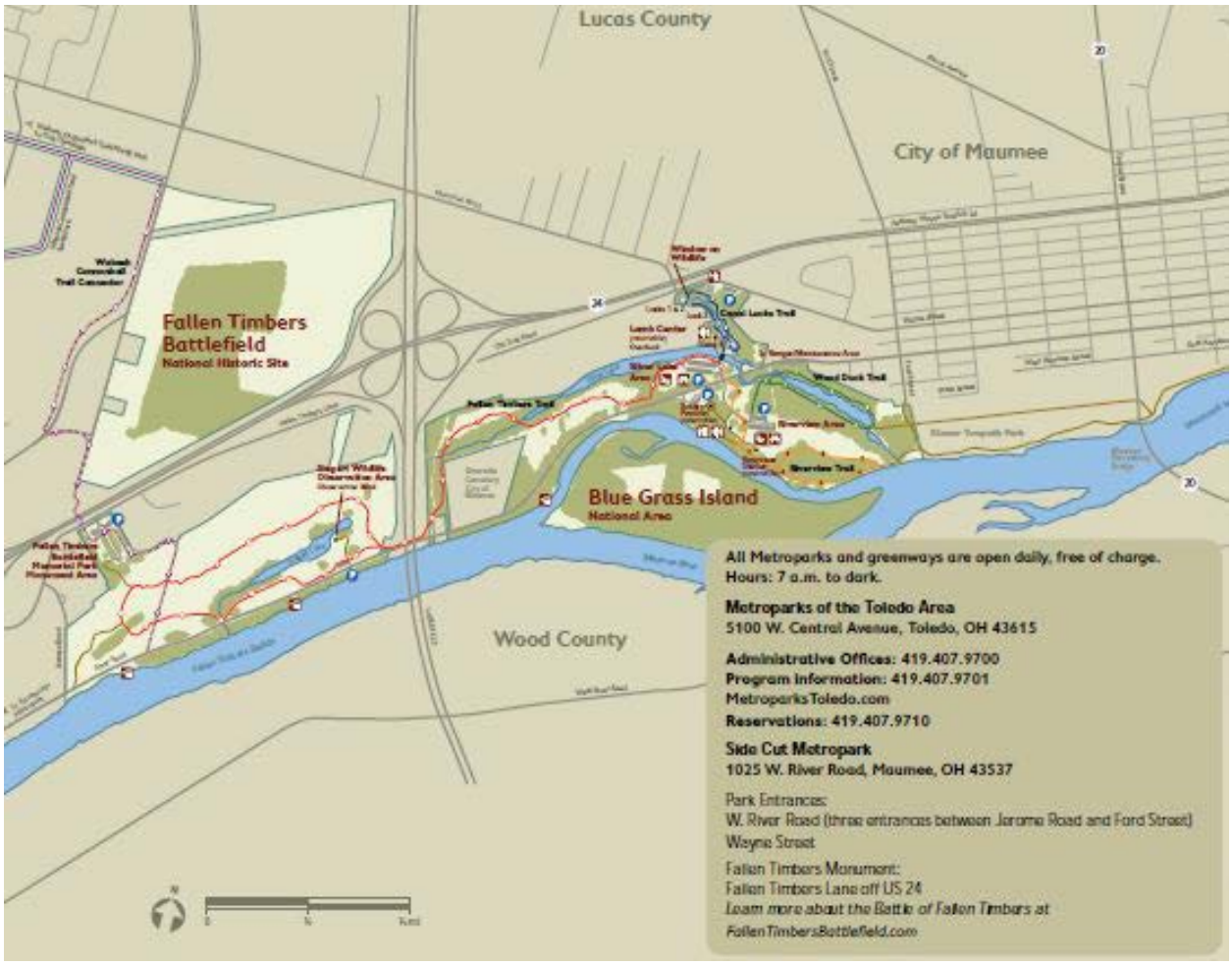
Park Overview Map

Middlegrounds

Oak Openings Preserve


Seaman Rd.
North Entrance
Restored Wetland
Homestead Shelter
(reservable)
Jahlin Cabin
Starr Ave. Bikeway Trail
Starr Ave.
Exit Only
Recycling Station
Exercise Trail
Ball Field Shelter
(reservable)
Park Ranger and Maintenance Complex
All Purpose Trail
Black Swamp Shelter
(reservable)
One Way
Playground Shelter
(reservable)
Tennis Court Shelter
(reservable)
Pearson Memorial
Trailhead
Packer - Hammersmith Center
(reservable)
Black Swamp Trail
Short Loop
Gazebo
Window on Wildlife
Wood Thrush Trail
Waterfall
Gazebo
Pearson Way
Lake Activities Center
Pedalboat Rental
Ice Skating
Macomber Lodge
(reservable)
All Purpose Trail
Main Entrance
Exercise Trail
SR 2 Navarre Ave.
Lallendorf Rd.
Wynn Rd.
Walking
Exercise Trail (2.9 mi round trip)
Black Swamp Trail (1.3 mi round trip)
Black Swamp Trail Short Loop (0.8 mi round trip)
Wood Thrush Trail (1.3 mi round trip)
Yellow Trail (north side) (0.56 mi round trip)
All-Purpose
Black (north side) (2.56 mi round trip)
Brown (3.0 mi round trip)
Starr Ave. Bikeway Trail (1.0 mi one-way trip)
Cross-Country Skiing
All trails in this park may be used for cross-county skiing.
N
0
¼ mi

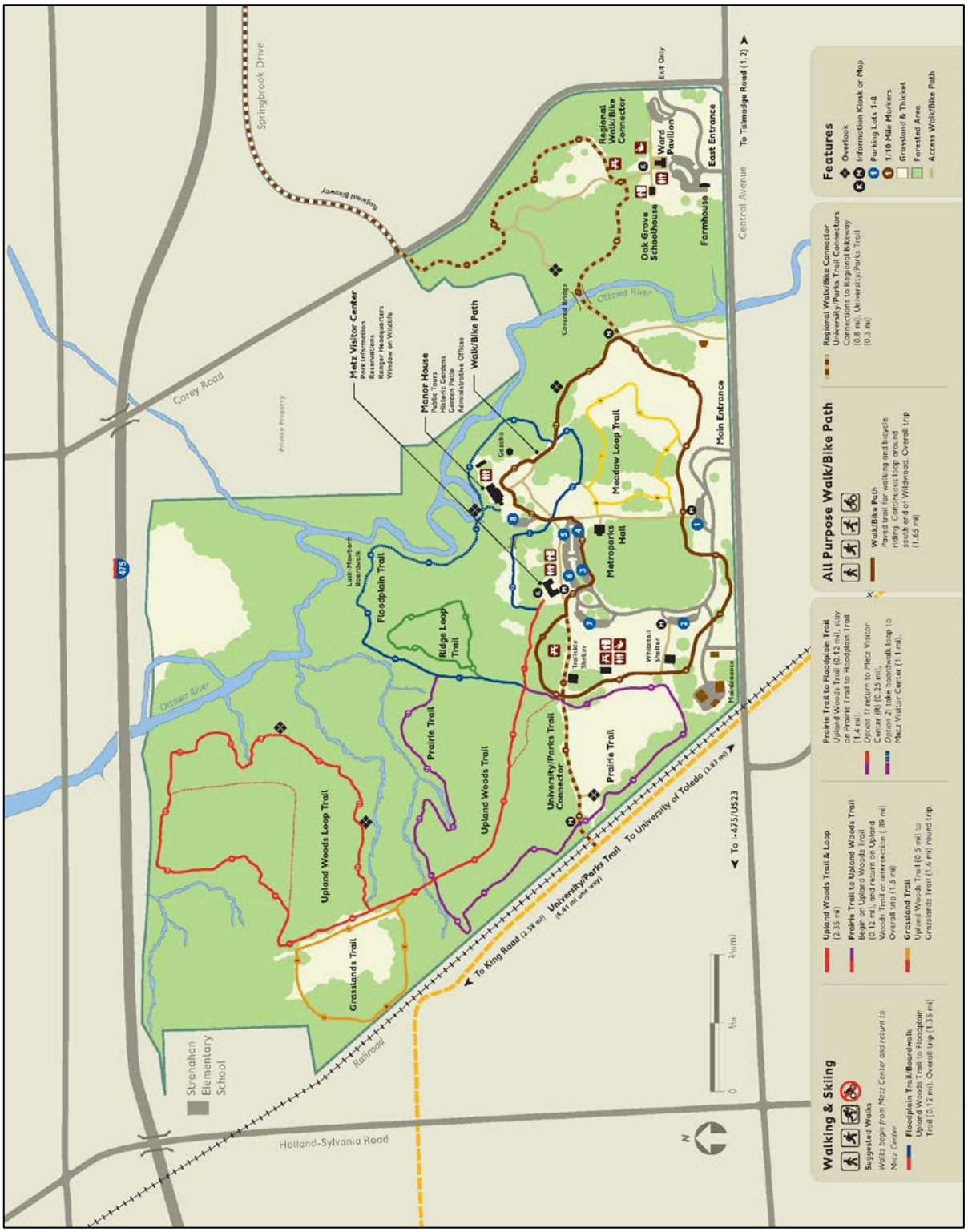
Pearson



Side Cut / Blue Grass Island / Fallen Timbers Battlefield

Swan Creek Preserve and Brookwood Area

Toledo Botanical Garden



Wildwood Preserve

ATTACHMENT B. Overwinter Deer Browse Damage Assessment

In 2015, Metroparks staff initiated a deer browse monitoring program adapted from the Kinzua Quality Deer Cooperative, McKean County, PA (see Benner 2007) within forested areas of Oak Openings Preserve and Wildwood Preserve. In 2016, this program was expanded to include forested areas of Swan Creek Preserve, Side Cut (including Blue Grass Island, and Fallen Timbers Battlefield. Along fixed transects in each park, 10-ft diameter (78.5 ft^2) plots were sampled every 200 feet prior to spring leaf-out during the month of April. Areas showing evidence of recent resource management activities by Metroparks staff were excluded from sampling. Within each sampling plot, all woody plants over 2 inches in height with leading stems < 4.5 feet in height were evaluated for browse impacts using the following scale:

1. Not Browsed – no visible browsing damage
2. Light – 0 to 50% of seedling stems are browsed
3. Moderate – more than 50% of stems are browsed but plant is not hedged
4. Heavy – more than 50% of stems are browsed and the plant is severely hedged (plant is browsed to a small ball of twigs), but it is taller than ½ foot.
5. Severe – no seedlings of the species within the plot are > ½ foot tall. Seedlings are severely hedged

Examples of heavy browse (left photo) and severe browse (right photo) from 2015 browse surveys.

Sampling plots with no woody seedling regeneration and those with no deer browse impacts were noted. Deer browse was distinguished from other herbivore browse (e.g., mice and rabbits) by the irregular, torn surfaces on twigs and by the height of browse. Within each sampling plot, woody plants were segregated into the following groups prior to assigning an overall numerical browse rating for each group. Additionally, each species group was assigned a browse preference rating following Wakeland and Swihart (2009):

Species group	Browse preference
Quercus sp. (all oak species)	high
Fraxinus sp. (all ash species)	high
Acer sp. (all maple species)	medium-high
Prunus serrotina (black cherry)	medium
Other trees (all other native tree species)	unassigned
Native shrub species (all)	unassigned
Invasive woody plant species (all)	unassigned

Deer browse damage assessment: Following 2019-20 culling operations, overwinter deer browse damage surveys were conducted between March 5 and March 18, 2020. A summary of browse survey results is shown in Figures 1 and 2 below. Overall trends in deer browse damage are consistent with population trends described in Section II D of this document. For example, percent of survey plots experiencing heavy to severe browse damage for Sidecut / Bluegrass Island and the Brookwood area were roughly two times greater than other park areas, while percent of survey plots experiencing woody plant regeneration at Side Cut / Bluegrass Island were nearly half that observed for most other park areas (see Figure 2). These results are consistent with observations during the 2020 helicopter snow counts, with deer densities at Side Cut / Bluegrass Island and the Brookwood area considerably higher than most other park areas.

For Oak Openings Preserve and Wildwood Preserve, where oaks are the dominant woodland species, response of understory oaks to reductions in browsing pressure over the past five years is especially pronounced (see Figure 2). Percent of survey plots experiencing heavy to severe browse damage of oaks decreased from a high of 66% and 100% (for Oak Openings Preserve and Wildwood Preserve, respectively) in 2015 down to 4% and 0% (for Oak Openings Preserve and Wildwood Preserve, respectively) in 2020. Percent of survey plots experiencing no oak browse damage increased from a low of 13% and 0% (for Oak Openings Preserve and Wildwood Preserve, respectively) in 2015 up to 75% and 91% (for Oak Openings Preserve and Wildwood Preserve, respectively) in 2020. Finally, percent of survey plots experiencing oak regeneration increased from a low of 20% and 1% (for Oak Openings Preserve and Wildwood Preserve, respectively) in 2015 up to 34% and 71% (for Oak Openings Preserve and Wildwood Preserve, respectively) in 2020. While the pronounced increase in oak regeneration in 2020, especially at Wildwood Preserve, is almost certainly related to reductions in browse pressure following 5 years of targeted population reductions, the observed increase in oak regeneration in 2020 is also likely related to heavy mast production observed in the fall of 2018.

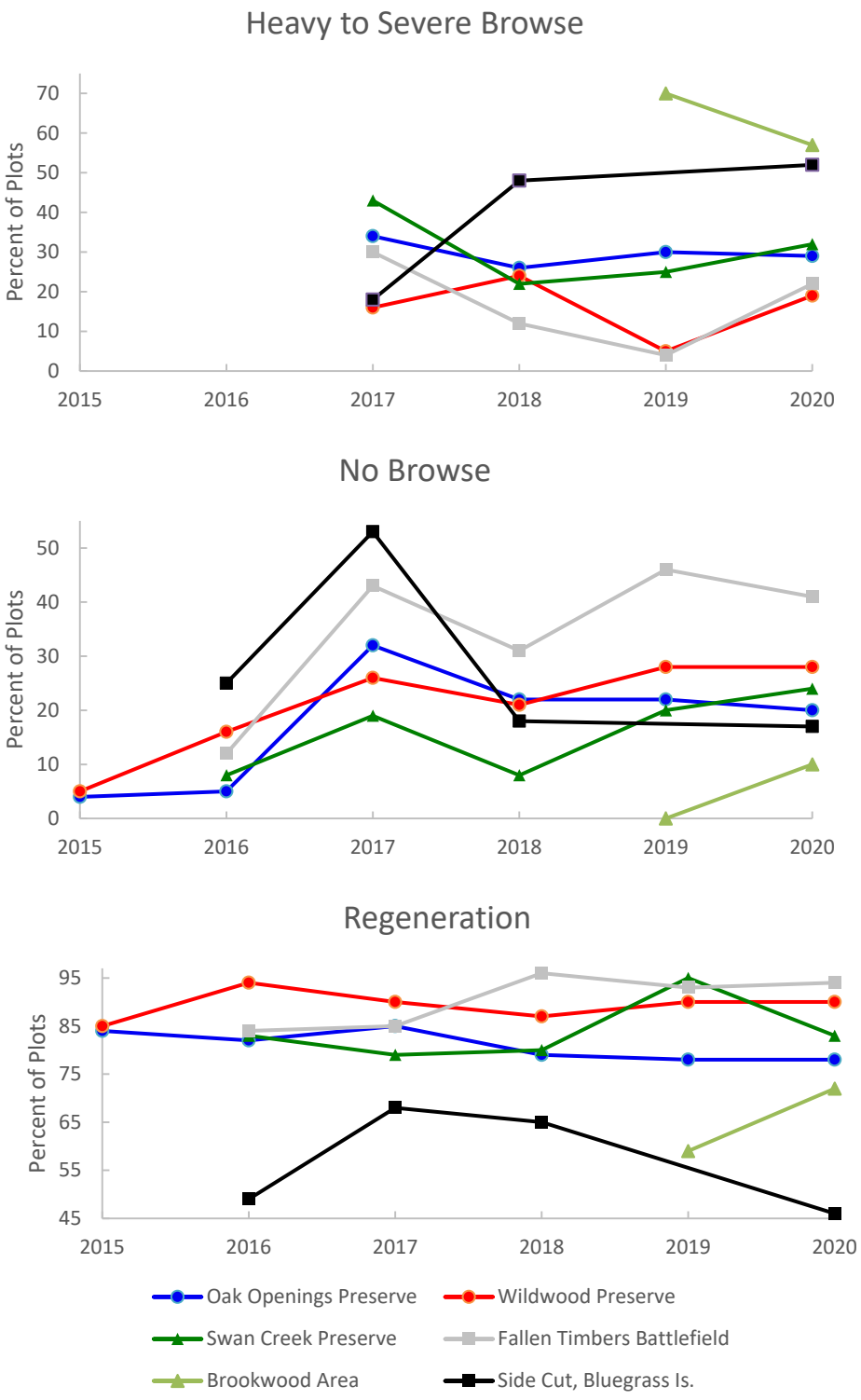


Figure 1. **Overall overwinter deer browse damage** observed between 2015 and 2020 for six park areas. Browse damage surveys were conducted in March/April each year prior to leaf-out. Note that in 2017 persistent overwinter snow cover protected many seedlings from direct browse damage.

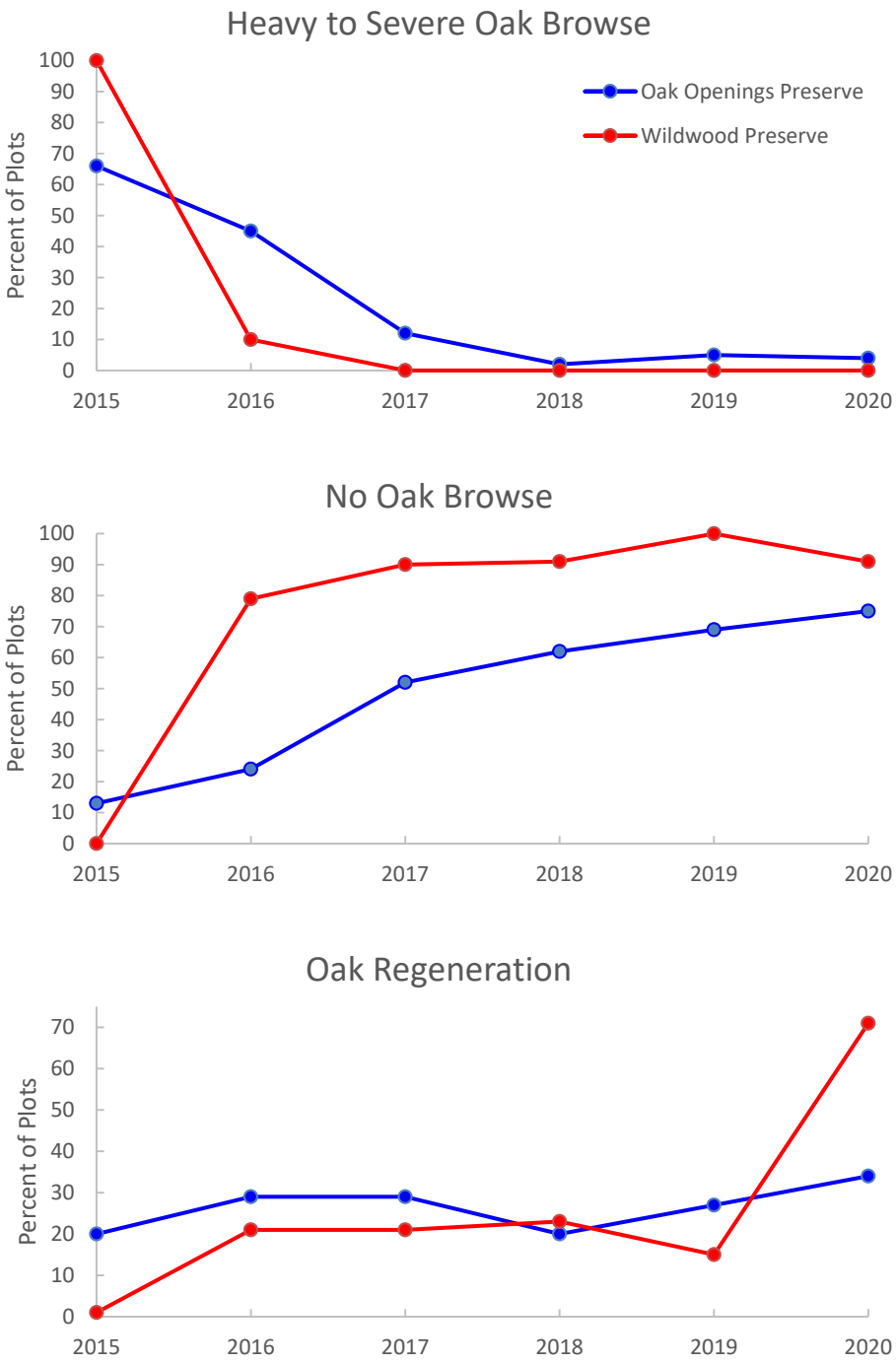


Figure 2. **Overwinter deer browse damage of oak seedlings** observed between 2015 and 2020 for two park areas. Browse damage surveys were conducted in March/April each year prior to leaf-out. Note that heavy acorn production was observed in fall of 2018, likely contributing to increased oak regeneration observed in 2020

ATTACHMENT C - Summary of Controlled Archery Program Data from the 2013-14 Hunting Season to Present. Regular hunting areas were located within undeveloped parklands in western Lucas County. Up to two hunters were allowed to hunt each regular hunting area throughout the regular archery season. Special opportunity hunting areas were located within specially designated park areas, primarily within Oak Openings Preserve. A single hunter was allowed to hunt from each special opportunity area.

Hunting Season	2013-14	2014-15	2015-16		2016-17		2017-18		2018-19		2019-20	
	Regular	Regular	Regular	Spec. Op.	Regular	Spec. Op.	Regular	Spec. Op.	Regular	Spec. Op	Regular	Spec. Op
Permits Issued:	98	108	90	21	78	55	66	72	60	36	60	41
Deer Harvested:												
Female	17	12	10	16	5	17	5	18	3	20	6	16
Adult Male	3	4	1	2	9	5	2	4	4	3	3	5
Yearling Male	2	3	2	3	6	6	1	6	2	3	1	4
Total	22	19	13	21	20	28	8	28	9	26	10	25
Harvest per permit:	0.22	0.18	0.14	1	0.26	0.51	0.12	0.39	0.15	0.72	0.17	0.61
Total Man-hours:	-	2,621	2,199	687	2,252	1,142	1,611	1,033	1,736	1,216	2,074	839
Man-hours per harvest	-	138	169	33	113	41	201	37	193	47	207	34

ATTACHMENT D
WORK PLAN

Introduction

The U.S. Department of Agriculture (USDA) is authorized to protect American agriculture and other resources from damage associated with wildlife. The primary authority for Wildlife Services (WS) is the Act of March 2, 1931 (46 Stat. 1468; 7 USCA 8351-7 USCA 8352) as amended, and the Act of December 22, 1987 (101Stat. 1329-331, 7 USCA 8353). Wildlife Services activities are conducted in cooperation with other Federal, State and local agencies; private organizations and individuals.

Purpose

To assist the MPTA with meeting the objectives of their White-tailed Deer Management Plan.

Planned APHIS WS Activities

This work plan is contingent upon an approved deer management plan between the MPTA and the Ohio Division of Wildlife, and the resulting permit issued by the Ohio Division of Wildlife and the issuance of an MPTA permit.

Through the implementation of management measures described below, APHIS WS will assist the MPTA with initiating the sharpshooting portion of their White-tailed Deer Management Plan. These objectives are to help reduce damage to natural resources caused by white-tailed deer in the MPTA. Operational areas currently covered by this agreement are Oak Openings Preserve, Wildwood Preserve, Side Cut Preserve, Swan Creek Preserve and Fallen Timbers Battlefield. Additional areas in MPTA could be considered, but are subject to APHIS WS availability.

APHIS WS employees will be used to assist with initiating the sharpshooting portion of the White-tailed Deer Management Plan of the MPTA. WS will coordinate with the MPTA project coordinator and Ohio Division of Wildlife (ODW) staff to inspect, propose and certify baiting and shooting zones to be used. APHIS WS personnel will prepare and arrange any necessary deer damage management equipment. WS will conduct removal of white-tailed deer from the MPTA using rifles equipped with noise-suppression devices. WS will conduct removal activities for up to 12 nights between December 1st and March 31st during the 2 year agreement period (16 nights total over a 2 year period). Every effort will be made to conduct removal activities during this time period but activities are contingent upon weather conditions.

MPTA will be responsible for the following:

- Obtain Deer Permits from ODW and any other necessary authorizations naming APHIS WS as subpermittee.
- Provide a Project Coordinator during all phases of the project. The Project Coordinator shall be reachable via cellular phone during removal activities.
- Provide yearly white-tailed deer population estimates as needed.
- Stock bait sites nightly, during an agreed upon time window, and for at least 10 days continuously prior to removal operations. Bait sites shall be agreed upon by APHIS WS and the MPTA.
- Law enforcement shall verify that shooting areas are closed and empty of visitors prior to removal operations.
- Law enforcement shall be available during removal operations and in direct communications with APHIS WS.
- Eviscerate, clean, and temporarily store deer carcasses immediately following daily operations.
- MPTA will pick up carcasses after sharpshooting activities have been conducted.
- MPTA will collect any biological data as required by ODW.
- Transport deer carcasses to the designated venison processor each within 24 hours of removal.
- Maintain records as required by ODW and report results to ODW and APHIS WS upon completion of the program.

<u>Monitoring of Accomplishments</u>
APHIS WS will provide weekly logs to the MPTA during active operation periods.